CLAIMS

1. A method for selecting paths to route incoming traffic through a communication network in which a plurality of label switched paths between an ingress node and an egress node are provided, and the incoming traffic at the ingress node is labeled and delivered through the network to the egress node, said method comprising the steps of:

allocating a plurality of forwarding elements of the incoming traffic at the ingress node to each label switched path of the plurality of label switched paths; and

delivering the labeled traffic on the plurality of label switched paths so as to route the labeled traffic through the network to the egress node.

2. The apparatus of claim 1, wherein the delivery step delivers the labeled traffic on a forwarding elements basis.

3. The apparatus of claim 1, wherein the forwarding elements are forwarding equivalent class elements FEC and the delivery step delivers the labeled traffic on an FEC elements basis.

4. The method of claim 1, wherein the allocating step further allocates the plurality of forwarding elements equally among the plurality of label switched paths.

5. The method of claim 1, wherein each label switched path of the plurality of label switched paths is associated with a physical link.

6. The method of claim 5, wherein the allocating step further allocates the plurality of forwarding elements equally among a plurality of physical links.

7. A method for selecting paths to route incoming traffic through a communication network in which a plurality of label switched paths between an ingress node and an egress node are provided, each label switched path of the plurality of label switched paths being associated with a physical link having a data rate, and the incoming traffic at the ingress node is labeled and delivered through the network to the egress node, said method comprising the steps of:

allocating a plurality of forwarding elements of the incoming traffic at the ingress node to each label switched path of the plurality of label switched paths, the number of forwarding elements allocated to each of the label switched paths being proportional to the data rate of the respective associated physical link; and

delivering the labeled traffic on the plurality of label switched paths on a forwarding element basis so as to route the labeled traffic through the network to the egress node.

8. A method for selecting paths to route incoming traffic through a communication network in which a plurality of label switched paths between an ingress node and an egress node are provided, and the incoming traffic at the ingress node is labeled and delivered through the network to the egress node, said method comprising the steps of:

allocating a plurality of forwarding elements of the incoming traffic at the ingress node to the plurality of label switched paths, each respective label switched path having a weight factor, and the number of forwarding elements allocated to each of the label switched paths being proportional to the weight factor of the label switched path; and

delivering the labeled traffic on the plurality of label switched paths on a forwarding element basis so as to route the labeled traffic through the network to the egress node.

9. The method of claim 8, wherein each label switched path of the plurality of label switched paths is associated with a physical link having said weight factor.

10. A method for selecting paths to route incoming traffic through a communication network in which a plurality of label switched paths between an ingress node and an egress node are provided, and the incoming traffic at the ingress node is labeled and delivered through the network to the egress node, said method comprising the steps of:

assigning a priority from a set of priorities to each label switched path of the plurality of label switched paths;

allocating a plurality of forwarding elements of the incoming traffic at the ingress node to the plurality of label switched paths in order of the respective priorities of the plurality of label switched paths, the incoming traffic being allocated to label switched paths having a first priority until an amount of traffic exceeds a predetermined threshold; and

delivering the labeled traffic on the plurality of label switched paths on a forwarding element basis so as to route the labeled traffic through the network to the egress node, wherein after the amount of traffic delivered on said label switched paths having a first priority has exceeded the predetermined threshold, the traffic is allocated to others of the plurality of label switched paths having a second priority lower than the first priority of said one of the plurality of label switched paths.

11. A method for selecting paths to route incoming traffic through a communication network in which a plurality of label switched paths between an ingress node and an egress node are provided, and the incoming traffic at the ingress node is labeled and delivered through the network to the egress node, said method comprising the steps of:

allocating a plurality of forwarding priorities to a plurality of forwarding elements of the incoming traffic at the ingress node;

assigning a priority from a set of priorities to each label switched path of the plurality of label switched paths;

allocating the plurality of forwarding elements of the incoming traffic at the ingress node to the plurality of label switched paths in order of the respective priorities of the plurality of label switched paths and in order of the respective forwarding priorities of the plurality of forwarding elements; and

delivering the labeled traffic on the plurality of label switched paths on a forwarding element basis so as to route the labeled traffic through the network to the egress node.

12. The method of claim 11, wherein after an amount of traffic delivered on a label switched path having a first priority has exceeded a predetermined threshold, the traffic is allocated to other label switched paths of the plurality of label switched paths having a second priority lower than the label switched path having a first priority.

13. An ingress-node apparatus that selects paths to route incoming traffic through a communication network in which a plurality of label switched paths between an ingress node and an egress node are provided, and the incoming traffic at the ingress node is labeled and delivered through the network to the egress node, said apparatus comprising:

an allocation unit for allocating a plurality of forwarding elements of the incoming traffic at the ingress node to each label switched path of the plurality of label switched paths; and

a traffic delivery unit for delivering the labeled traffic on the plurality of label switched paths so as to route the labeled traffic through the network to the egress node.

14 . The apparatus of claim 13, wherein the traffic delivery unit delivers the labeled traffic on a forwarding elements basis.

15. The apparatus of claim 13, wherein the forwarding elements are forwarding equivalent class elements FEC and the traffic delivery unit delivers the labeled traffic on an FEC elements basis.

16. The apparatus of claim 13, wherein the allocation unit further allocates the plurality of forwarding elements equally among the plurality of label switched paths.

17. The method of claim 13, wherein each label switched path of the plurality of label switched paths is associated with a physical link.

18. The method of claim 17, wherein the allocation unit further allocates the plurality of forwarding elements equally among a plurality of physical links.

19. An ingress-node apparatus that selects paths to route incoming traffic through a communication network in which a plurality of label switched paths between an ingress node and an egress node are provided, and the incoming traffic at the ingress node is labeled and delivered through the network to the egress node, said apparatus comprising:

an allocation unit for allocating a plurality of forwarding elements of the incoming traffic at the ingress node to the plurality of label switched paths, the respective label switched paths being associated with a physical link having a data rate, and the number of forwarding elements allocated to each of the label switched paths being proportional to the data rate of the associated physical link; and

a traffic delivery unit for delivering the labeled traffic on the plurality of label switched paths on a forwarding element basis so as to route the labeled traffic through the network to the egress node.

20. An ingress-node apparatus that selects paths to route incoming traffic through a communication network in which a plurality of label switched paths between an ingress node and an egress node are provided, and the incoming traffic at the ingress node is labeled and delivered through the network to the egress node, said apparatus comprising:

an allocation unit for allocating a plurality of forwarding elements of the incoming traffic at the ingress node to the plurality of label switched paths, each respective label switched path having a weight factor, and the number of forwarding elements allocated for each of the label switched paths being proportional to the weight factor of the respective label switched path; and

a traffic delivery unit for delivering the labeled traffic on the plurality of label switched paths on a forwarding element basis so as to route the labeled traffic through the network to the egress node.

21. An ingress-node apparatus that selects paths to route incoming traffic through a communication network in which a plurality of label switched paths between an ingress node and an egress node are provided, and the incoming traffic at the ingress node is labeled and delivered through the network to the egress node, and a priority of a set of priorities is assigned to each label switched path of the plurality of label switched paths, said apparatus comprising:

an allocation unit for allocating a plurality of forwarding elements of the incoming traffic at the ingress node to each label switched path of the plurality of label switched paths in order of the respective priorities of the plurality of label switched paths, an amount of traffic is delivered to label switched paths having a first priority until the

amount exceeds a predetermined threshold; and

a traffic delivery unit for delivering the labeled traffic on the plurality of label switched paths on a forwarding element basis so as to route the labeled traffic through the network to the egress node, wherein after the amount of traffic delivered to the label switch paths having a first priority has exceeded the predetermined threshold, the traffic is routed to others of the plurality of label switched paths having a second priority lower than the label switched paths having a first priority.

22. An ingress-node apparatus that selects paths to route incoming traffic through a communication network in which a plurality of label switched paths between an ingress node and an egress node are provided, and the incoming traffic at the ingress node is labeled and delivered through the network to the egress node, a plurality of forwarding priorities being allocated for a plurality of forwarding elements of the incoming traffic at the ingress node, and a priority of a set of priorities being assigned to each label switched path of the plurality of label switched paths, said apparatus comprising:

an allocation unit for allocating the plurality of forwarding elements of the incoming traffic at the ingress node to the plurality of label switched paths in order of the respective priorities of the plurality of label switched paths and in order of the respective forwarding priorities of the plurality of forwarding elements; and

a traffic delivery unit for delivering the labeled traffic on the plurality of label switched paths on a forwarding element basis so as to route the labeled traffic through the network to the egress node.

23. The apparatus of claim 22, wherein after an amount of traffic delivered to a label switch path having a first priority has exceeded a predetermined threshold, the traffic is routed to other label switched paths of the plurality of label switched paths having a lower priority than the label switched path having a first priority.

24. The apparatus of claim 23, wherein the label switched path having a first priority is a plurality of label switched paths having a first priority.

25. A communication network in which a plurality of label switched paths are provided and incoming traffic is labeled and delivered through the network, said communications network comprising:

an ingress unit where the incoming traffic is received and grouped into a plurality of forwarding elements, each forwarding element of the plurality of forwarding elements is allocated to a label switched path of the plurality of label switched paths, and the forwarding elements are labeled and delivered to the respective label switched paths so as to route the labeled traffic through the network; and

an egress unit that receives the labeled traffic from the plurality of label switched paths and removes the labels and reassembles the outgoing traffic.

26. The communication network of claim 25, wherein the incoming traffic is grouped into a plurality of forwarding equivalent class (FEC) elements and the FEC elements are allocated to the plurality of label switched paths on an FEC element basis.

27. The communication network of claim 26, further comprising:

an allocating unit for equally allocating the FEC elements of the incoming traffic at the ingress node among the plurality of label switch paths.

28. The communication network of claim 26, further comprising:

an allocating unit for allocating a number of FEC elements of the incoming traffic at the ingress node among the plurality of label switched paths in proportion to a data rate of each label switched path, wherein each label switched path of the plurality of label switch paths being associated with the physical link having a respective data rate.

29. The communication network of claim 28, wherein the data rate of each label switched path is determined in proportion to an associated physical link data rate.

30. The communication network of claim 29, further comprising:

an allocating unit for allocating a number of FEC elements of the incoming traffic at the ingress node in proportion to a weight factor of the respective label switched path, wherein each label switched path of the plurality of label switch paths having a weight factor.

31. The communication network of claim 30, wherein the weight factor of each label switched path is determined in proportion to an associated physical link weight factor.

32. The communication network of claim 26, further comprising:

an assigning unit for assigning each label switched path of the plurality of label switch paths a priority from among a set of priorities,

an allocating unit for allocating the FEC elements of the incoming traffic at the ingress node to the label switched paths in order of the respective priorities of the plurality of label switched paths, and allocating the traffic to others of the plurality of label switched paths having a second priority lower than label switched paths having a first priority after an amount of traffic delivered to the label switched paths having a first priority has exceeded a predetermined threshold.

33. The communication network of claim 26, further comprising:

an assigning unit for assigning the FEC elements of the incoming traffic at the ingress node FEC priorities from a plurality of FEC priorities,

a mapping unit for mapping a priority from among a set of priorities to each label switched path of the plurality of label switch paths,

an allocating unit for allocating the FEC elements of the incoming traffic at the ingress node to the label switched paths in order of the respective priorities of the plurality of label switched paths and in order of the respective FEC priorities of the plurality of FEC elements, and allocating the traffic to others of the plurality of label switched paths having a second priority lower than label switched paths with a first priority after an amount of traffic delivered to the label switched paths having a first priority has exceeded a predetermined threshold.